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Editorial.

GLANDERS IN MAN.

ALTHOUGH glanders, fortunately, does not occur very frequently in man, the danger is never to be lost sight of by those whose lives are spent amongst the equine tribe ; and the case of a veterinary officer, whose death from this disease was recently reported in *The Lancet*, is abstracted on a subsequent page of this issue of THE VETERINARY JOURNAL as a reminder of one of the serious risks incurred by those who follow our profession. It speaks well for the precautions taken, in the form of lectures and warnings given, by the Veterinary Service during the past war that no cases of the kind occurred amongst the thousands of men employed in the care of the horses and mules.

It stands out as a useful lesson of the value of the dissemination of knowledge, for although comparatively few knew anything about horse management at the commencement, they were only amongst their animals a few days before they understood the danger that *might* be lurking behind a nasal discharge, and such was reported at once.

The difficulty of diagnosis in man was, as is not unusual in glanders, typically exemplified in this case. The bacteriological reports were

negative, and it was only " in view of the profession of the patient, and as he had been employed in the manufacture of mallein," that glanders was considered. On this point, the diagnosis question, we have, in the use of mallein, a great advantage over our medical *confreres*, and it is a thousand pities that this agent (or some other of like efficiency) cannot be manipulated as a test for this obscure disease in the human subject in the same way as it is used in veterinary diagnosis for glanders in the horse and mule.

BOWEL SURGERY IN THE HORSE.

Professor Ghisleni's article, translated from the Italian and published in this month's issue, is of exceptional interest because it indicates a stage of progress in the abdominal surgery of the horse in that a very large calculus was removed from the large intestine and the patient recovered. The calculus, in this case, lay in the cæcum, which rendered the task a little less difficult than if it had been in the large colon, but even in this situation the risk attending a surgical removal was well nigh insuperable, and it is questionable if this operation can possibly be repeated many times with success.

To operate upon the small intestine is a comparatively easy matter, but, unfortunately, calculi in the horse are never found here. In the smaller animals, especially the dog and cat, foreign bodies have been extracted satisfactorily scores of times, and from all parts of the intestine, but with the horse it is different, and our esteemed colleague, Professor Ghisleni, is to be warmly congratulated on the lead he has given us.

Original Communications.

TREATMENT OF MANGE AND LICE.

By HAMILTON KIRK, Capt., R.A.V.C.
(*E.A. Divisional Veterinary Hospital, Huntingdon.*)

In August, 1917, I wrote an article on this subject to the *Veterinary News* from France. In discoursing further on this disease I must confess to a certain modification of my views, as I have since been on Home Service, where the methods of treating skin disease appear to be somewhat divergent from those obtaining in France. There we were almost solely confined to the calcium sulphide dip, of which I was a strong advocate in 1917. It certainly did effect a cure, but I realise it was too slow a process to be really economical, although its cost was small in comparison with oily dressings. A certain proprietary arsenical dip has been extensively used in some hospitals at home, but my experience with it has not impressed me with its

efficacy as a cure for diagnosed mange. In fact, I made some experiments which gave decidedly poor results. The first was the spraying of a dung heap (which was black with flies) for half an hour, using a 1 per cent. solution and taking care that every square inch was thoroughly wetted. Even flies that were purposely caught and held in the spray for two minutes recovered and walked away after 20 minutes. This was repeated three hours later, and in the afternoon the manure heap was just as thickly covered with flies as ever, nor could I find any dead ones. I next submerged 20 lice (*Hæmatopinus pilosus*) in a watch glass containing a 1 in 80 solution of Cooper's Dip, and for ten minutes they were all still alive. Owing to my being called away, they were removed and placed in a dry crucible where they were found dead next morning. Seventeen (*Hæmatopinus pilosus*) lice were placed in a 1-150 solution of dip, and all appeared dead at the end of 14 minutes, but half an hour after removal into the dry, six showed signs of recovery, and 2½ hours later two were still alive, one had crawled away, and the rest were dead. The strength of solution used for this test was the same as that used upon horses, but it must be remembered that a louse in its natural environment has a much better chance of escaping the effects of dressing than it has upon a slide, and if it can live 14 minutes in total submersion, how long would it live on a horse's skin, which rapidly dries. Yesterday I placed a live Psoropt in a drop of the dip on a slide (strength 1-80) and for four minutes it was alive, then becoming quiescent. It was removed to a dry slide, and an hour and a half afterwards still showed no sign of life. Another Psoropt was placed in a 1-150 solution, and lived for 45 minutes, never afterwards recovering. I leave your readers to draw their own conclusions from these experiments.

I stated in my previous article that the oily dressing, though good in itself, was a blistering agent, and would probably be too expensive for wholesale use, and though these statements are true to-day, they bear modification. Mr. Maurice Hall, Ph.D., in his very exhaustive article on the " Control of Lice," quotes me as having asserted that horse fat will not blister a horse's skin, and complains that in consequence he dressed 14 horses with a mixture of horse fat, linseed oil, and coal-tar creosote oil, and left it on for several days, with the result that the horses lost a considerable amount of hair. In the first place, I did not say that linseed oil or coal-tar creosote oil would not blister, nor does Mr. Hall state whether he took any steps to purify the fat before application. In any case, to leave it on for several days was rather inviting trouble, though he may have been misled by what I said. Captain Barron, A.V.C., has lately revived interest in horse fat dressings for mange, and claims most

excellent results. For the last nine weeks I have been successfully employing precisely the same treatment, which is as follows :—Horse fat is boiled in water, to which has been added Sodæ Bicarb. (to neutralise any acids in the fat) for two hours. It is then skimmed off and the process repeated in fresh water. Skim off again and add Sulph. Sub. 1 part to six of fat, and about two ounces Boric Acid per five gallons as a preservative. Any fat or oil which is applied rancid or impure, or becomes rancid while *in situ*, will assuredly blister the skin. This dressing is applied at blood heat with a cloth, from the tips of the ears to the coronets, and then scrubbed in with a dandy brush. On the following day the horse is thoroughly hand-rubbed, whilst on the third day it is carefully washed and scrubbed with hot water and soap. Naturally a large amount of soap is required to wash greasy horses well, and as this is now a scarce commodity, every expedient must be used to ensure its economical use. Two of the greatest of these are : (1) the production of a profuse perspiration of the horse before commencing to wash, and (2) the use of washing soda in the water. Captain Barron claims that one dressing will often effect a cure, but that if any itchiness remains, a second or even third dressing may be applied, though three are rarely ever required. Thoroughness is the key-note of success, and the observance of detail and cleanliness of paramount importance. I have given the method a good trial and am highly satisfied with the results, for the skin is rendered soft and pliable and no blistering ensues. I might, however, mention in passing, that if a dressed horse is permitted to be exposed to the sun, depilatory effects will follow, and the same misfortune occurs if the dressing is left on too long, or is applied without previous purification. Hall remarks that I made no mention in my article as to the efficacy of horsefat for lice. Three sucking lice were placed in a drop of fat and sulphur dressing (as used for mange) and in four minutes two were dead, the other expiring in five minutes. Upon being removed to a dry slide they did not recover. I have never observed lice to reappear on a horse after it had been dressed with horsefat and sulphur, thus proving that the dressing does have a decidedly derogative effect on the nits, a much more decided effect than arsenical dip. I quite agree with Mr. Hall when he states that a greased horse will be more susceptible to cold than a dry one. This is undoubtedly the case, and horses so treated should be protected as much as possible from cold or wind, preferably in a building, and not by the use of rugs. With a fairly constant average of 90 skin cases in my mange lines, I was able to discharge 64 between August 1st and 21st with this treatment, though only 15 of these were definite cases of purely Psoroptic and Sarcoptic mange, 31 being negative,

7 forage acari, 4 lice, 2 ringworm, 2 Psoropt and forage acari, 2 psoropt and lice, and 1 ringworm and forage acarus. This, however, does not conclusively prove that those diagnosed as negative or forage acarus cases, have not also got scabies. Certain it is that a large number of negative cases take just as long to cure as the psoroptic cases, as proved by the following :—

Average time required to cure Psoropts .. $24\frac{1}{2}$ days
" " " " Negatives .. 23 "
" " " " Forage acari $22\frac{1}{3}$ "

At first glance $22\frac{1}{3}$ days for curing forage acari seems far too long, but as I said before, I am convinced that in many cases something more exists in their skins, although it is not always discovered. Many psoroptic cases have been cured in less than 24 days, whilst my minimum time so far is 12 days, and this, I think, speaks very well for the method of treatment now in vogue. Complaints have often been heard that horses discharged as cured of mange have later been returned as still affected.

This is explained, in my opinion, by the fact that the horse on discharge has a live egg on its skin, which, of course, cannot be clinically discovered, and the animal might be scraped all over before it could be found microscopically. A veterinary officer can only base his opinion upon what he sees, and it would be quite impossible to say that an egg did not exist. Then there is always the possibility that after leaving hospital a horse may become reinfected. I have noticed in the few cases that have been returned to me (not more than 5 per cent.) the period elapsing before their readmittance has been three weeks to a month, which seems to prove that a month is the time required for an egg to hatch out and mature and cause irritation.

Sarcoptic mange is only seldom found in this hospital, and demodectic is very rare. I have only seen two cases of Follicular in the horse during my service in the army, and the lesions produced were moist raised bumps all over the body, and very much resembling Acne. It has so far been too rare to permit of any experiments being made, or any information being gained as to its degree of infectivity. The last case that passed through my sub-division was a mixed infection of sarcoptic and demodectic mange, and it remained 41 days before discharge, the treatment being horsefat and sulphur. Mr. Hall asserts that the fumigation with SO_2, as advocated in the French Army, is a dependable method of dealing with lice, but I am afraid my experiences in France with this treatment have led me to quite the reverse conclusion. Ten cubicles were especially built at No. 12 Veterinary Hospital to test this method of treating scabies, and I was deputed to carry out experiments. Only psoroptic cases were

chosen for these tests, as the psoropt does not burrow. Ten horses were exposed to the gas for two hours, their faces alone being in the open air, and at the end of the time, live lice were actually found upon them, whilst in scraping we found live psoropts. The process was repeated two days later with the same results, and upon a third occasion using a stronger concentration of gas than that recommended by the inventor, we fared no better. As regards the best treatments for lice, those I favour are, in this order :—

1. Horse fat and sulphur dressing.
2. Singeing, followed by washing with Jeyes' fluid.
3. Sponging with a 33 per cent. solution of glacial acetic acid.

All of these methods directly affect the egg as well as killing the louse, but they must be preceded by clipping.

GLYCYPHAGUS DOMESTICUS DE GEER, AN ACCIDENTAL PARASITE IN THE EAR OF THE DOMESTICATED RABBIT.

By A. W. NOEL PILLERS, F.R.C.V.S.

On March 16, 1920, I received two slides upon which were mounted several specimens of mites, stated to have been taken from the inside of a tame rabbit's ear by Mr. C. J. Davies.* I have examined material from rabbits' ears on many occasions and have frequently come across the auricular psoropt *Psoroptes communis cuniculi.* In this case, however, it was easy to see that the specimens did not belong to any of the mange-producing genera. On comparing them with the figures given in Michael[1] and contrasting them with mounted specimens of *Glycyphagus spinipes,* I found them to be *Glycyphagus domesticus.* These two species are somewhat similar, and going over the matter with Prof. R. Newstead, F.R.S., he informed me that in his experience the former species was by far the commoner as a grain pest, and the latter extremely rare.

Rather than enter into a detailed description, I have added a photo of a mite from the ear, Fig. 1, and also copies of the male and female from Michael, Figs. 2 and 3. They are, however, about half a millimetre long and just visible when moving among their food. All the characters by which the mange mites are known are naturally wanting. In the photos the tubular bursa copulatrix at the posterior border of the abdomen of the female, and the very fine hairs which clothe the larger dorsal ones, can easily be made out. Like a number of allied mites the life cycle of this species contains a hypopial stage. As will be seen from Fig. 4 it is extremely rudimentary.

The adults of the family Tyroglyphidæ, to which the mite under

* See Mr. Davies' article on the "Canker of the Ear in Rabbits" on page 86 of The Veterinary Journal for March, 1920.

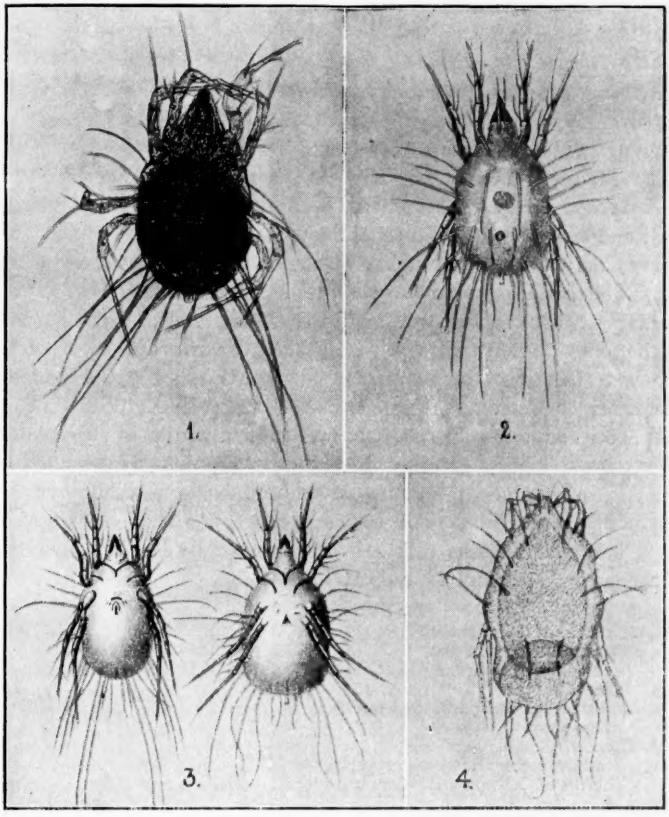

FIG. 1.—*Glycyphagus domesticus*, Female, dorsal aspect. From rabbit's ear. ×72.

FIG. 2.—*Glycyphagus domesticus*, Female, dorsal aspect (Michael). ×68.

FIG. 3.—*Glycyphagus domesticus*, Left Male. Right Female; ventral aspect (Michael). ×62.

FIG. 4.—*Glycyphagus domesticus*. Hypopus, dorsal aspect (Michael). ×125.

consideration belongs, are in the adult stages usually non-parasitic.

Michael (loc cit) gives the following synonymy :—

Acarus domesticus de Geer, Gmellin and Canestrini, and Fanzago.

Acarus siro Koch.

Glyciphagus cursor Gervais and Fumouze, and Robin.

? *Sarcoptes hippopodus* Hering.

? *Glyciphagus hippopodus* Gervais.

? *Glycyphagus prunorum* Hering.

Glycyphagus domesticus is stated to be common inside houses and buildings, upon all kinds of dried animal and vegetable matter, such as hay, fodders, dried fruits, drugs of vegetable origin and numerous materials of a sugary nature. It has been found in rush furniture, cork and even tobacco. Theobald[2] states that sugar merchants and grocers are frequently troubled with swarms of this species, which cause the irritating temporary affection known as " grocers' itch." Raillet[3] says that it was probably this species which Hering found in the foot of a horse affected with canker, and which he regarded as proper to this affection ; he made a new species of sarcopt of it under the name of *Sarcoptes hippopodus*. Garnett[4] relates the finding of this species among the scabs and parasites of a case of sheep scab. There are a number of other references to the mite upon man and animals, but the above bear most closely upon the possibility of the production of an animal skin lesion by it.

A case such as this emphasises the importance of a knowledge of the mange mites and their allies.

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2—Theobald, F. V., in The Animal Parasites of Man,—Fantham, Stephens and Theobald, p. 513. London, 1916.

3—Raillet, A., Traité de Zoologie médicale et agricole, p. 688. 2 ieme Edition. Paris, 1895.

4—Garnett, F. W., *Glyciphagus domesticus*—a non-pathogenic acarus accidentally present in a case of sheep scab. Journal of Comp. Path. and Ther., Vol. XV, p. 367. London, 1902.

ANKYLOSTOMA CEYLANICUM IN THE CAT IN DURBAN. *

By B. BLACKLOCK.

MATERIAL from Durban was sent by Dr. F. G. Cawston on 10th June, 1919, with the following notes :—

" *Ankylostoma duodenale* from a cat in Durban. The gut also contained a tapeworm, and death seems to have been caused by the numerous Ankylostoma."

The material consisted of ten female worms, of which nine were complete and in a good state of preservation.

*From the *Annals of Tropical Medicine and Parasitology*. Vol. XIII, No. 3.

It is not possible in the absence of specimens to describe the characters of the male bursa, but the general appearance of the females, the measurements and the arrangement of the chitinous buccal capsule and teeth have been studied.

Of the nine complete specimens the minimum length is 7.0 mm., the maximum 9.5 mm., the average 8.3 mm. The arrangement of the teeth is characteristic. There is a pair of large ventral teeth and also a very small pair situated at the base of these on a deeper plane. The measurements and mouth structure are, in fact, such that this parasite cannot be distinguished from *A. ceylanicum* (Looss). This parasite was recorded by Yorke and Blacklock (1915) in seven dogs in Sierra Leone, and was further referred to by them (1917) subsequent to Macfie's discovery of the same parasite in four of ten dogs at Accra (1916).

That this parasite should be found in Durban is of interest, more especially so if, as Dr. Cawston surmises, it should be the cause there of fatal disease in cats.

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ON THE DIAGNOSIS AND SURGICAL TREATMENT OF INTESTINAL CALCULI IN SOLIPEDS.*

LAPARO-ENTEROTOMY IN A MARE.—RECOVERY AND CURE.

BY PROF. PIETRO GHISLENI.
Professor of Surgery, Turin Veterinary School.

THE etiology of intestinal calculi in solipeds appears to us very interesting, considered not merely from the point of view of the usual medical, symptomatic, drastic treatment, or with the certainty of fatal termination, but also from the aspect of operative surgery, the present-day resources of which can successfully ensure direct intervention, even though it may appear difficult and daring.

The case I am about to present to my colleagues deserves to be known because :

1.—It was first decided to perform laparotomy, followed by laparo-enterotomy on a mare, fifteen years old, affected by an enormous calculus weighing 7 kilos, 845 grammes, the operation being quite successful and recovery perfect ;

2.—Because at the only examination made, diagnosis of the

*Translated by H. L. Somers, Capt., R.A.V.C.

calculus was possible by simple inspection and external palpation—this is considered a more than rare clinical exception; no other writer has hitherto been able to put it in evidence;

3.—Because this calculus was diagnosed as being in the cæcum of the mare, the operation confirming this; and that explains how a calculus of such exaggerated proportions had remained a long time without interrupting circulation of the alimentary mass, and only causing intermittent attacks of colic.

By relating our own experiences and by submitting to critical analysis and examination the results of the observations of others, we hope to bring a serviceable contribution to the "clinical chapter" on intestinal stones in general, and particularly as regards operating on such cases as solipeds.

If the idea of operating for the removal of intestinal calculi be old, it has not, however, been frequently employed; so much so that many writers, with the exception of a few surgeons, all refer to such operations theoretically as a rare possibility; among these exceptions are the Italians, Vachetti, Lanzillotti, and Baldoni.

In some treatises (Friedberger and Fröhner), for instance, we read that "recourse *may* be had to laparotomy in desperate cases"; in others, while its possibility is admitted, nobody advises its adoption. In a recently issued manual (Chiari) it is distinctly stated that "laparo-enterotomy for intestinal calculi in the horse is nearly hopeless"; "although advisable as a last resource, it is an operation of doubtful success" (Moretti). It is, moreover, stated by Drouin that the opening of the abdomen in equine colic has so far given few results of importance (1903). Now, if all this, as is certainly the case, has been written and produced on the basis of mortality statistics in grave abdominal operations on the horse, and especially with regard to laparo-enterotomy, our own case acquires all the greater importance, as it finished with rapid and complete recovery. It sometimes happens that veterinarians propose to perform this sanguinary operation, but the owner of the patient refuses, and we at once recall that Felizet père (*Revue Veterinaire* 1877) operated boldly on a five-year-old horse with a calculus in the floating colon at a time when such operations were performed under vastly less propitious conditions than would now be the case. We insist on the name of Felizet being honoured as that of the pioneer; also because in the more recent observations of Rickards, Dollar, and Rogers (1894), Liepke asserts that these writers were, in his opinion, the first to operate as surgeons in similar cases. But in truth it is only after the success of Felizet that one hears of the attempts of

Rickards, Dollar, and Rogers, who performed laparo-enterotomy on a mare eleven years old, from whose colon they removed a calculus weighing 2 lb. However, the patient died from fibrous peritonitis twenty-seven hours after the operation. It would seem that in spite of every precaution, the horse operated upon by Hall died in a few days. On the other hand, in the only recorded operation of Rogerson, who opened the left flank of a horse, and ascertained the presence of a large calculus in the pelvic area, the patient died under the knife. A similar case reported by Röder died eight days after the operation. After the enthusiastic declarations of Bourgelot (1897), after the praiseworthy efforts of Macqüeen, of the London College, we come to the

FIG. 1.—SHOWING ABNORMAL "BULGING" OF THE ABDOMINAL WALL DUE TO THE CALCULUS IN THE CÆCUM.

suggestion of L. Hoffmann (1904), a "new method" which he calls the "A," "for the removal of intestinal calculus in the horse."

Bearing in mind the possibility of manual removal, and remembering (as seen by us at Turin) that strong peristalsis may eject the stone spontaneously, L. Hoffmann proposes for certain cases simple laparatomy without enterotomy. In other terms, he advises the veterinarian to make an incision in the flank of 12 to 15 c.m., to put his sterilised hand into the peritoneal cavity, to thoroughly search that part of the intestinal track which usually contains the calculus, which must be grasped and pushed gradually towards the anus until it is eliminated. But, excepting some attempts by Hobday, of which we shall speak later, this "new" method has been by no means well received. And if Jobelot (1904), among others, in a case of obstruction by a calculus which formed round a molar tooth swallowed three years before, could by rectal exploration seize and break this calculus, and afterwards extract it from the anus and cure the patient, we must recognise that only the most successful and rarest cases have been

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reported. We now come to the operations of Marek (1905), who, ascertaining the cause by rectal exploration, removed a calculus from the colon of a horse by laparo-enterotomy. The operation lasted two hours, and the patient died the same day. Of no small value is the contribution of Hobday (1905), who, perhaps the only one, published statistics of nearly 500 cases of abdominal surgery in domestic animals. Among these are included half-a-dozen cases of laparotomy for intestinal calculus in solipeds; one of those recorded was performed by Hobday and Lowe. In two of the cases, both mares, Hobday, before cutting into the flank, made an aperture in the wall of the vagina, in order to push the calculus towards the anus. Let us, however, analyse rather closely the cases recorded by this author.

The first case reported in the *Journal of Comparative Pathology*

FIG. 2.—SHOWING MORE DISTINCTLY THE DEFORMITY IN THE AREA OCCUPIED BY THE CALCULUS.

and Therapeutics, 1897, operated on by Hobday, together with J. Bell and Browning, treats of a mare nine years old, and a simple laparotomy was made in order to remove the calculus, without, however, succeeding in pushing it towards the anus. The owner soon had the creature destroyed, as it suffered greatly. At the post-mortem a stone was found weighing 6 lb. In the second case laparotomy was effected, but Hobday was unable to relieve the griping pain at the seat of the calculus by bringing it to the side of the abdominal wall in order to proceed with the enterotomy. On the same day this animal died from gangrene of the intestine—the calculus found on post-mortem weighed 6 lb. 6 oz. The third case was that of a pony six years old, diagnosis made certain by rectal exploration. Laparotomy was performed, though the calculus could not be brought to the incision, and Hobday mercifully preferred to allow the animal to die under chloroform; the stone found on post-mortem weighed

4 lb. (1906). The fourth case was a mare eight or nine years old, in whose large colon Hobday was able to diagnose a calculus. An incision was then made in the wall of the vagina, through which the hand and arm were extended and the calculus pushed towards the

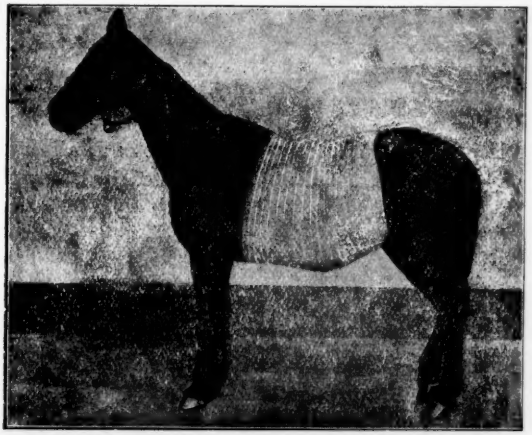


FIG. 3.—PHOTOGRAPH FIFTEEN DAYS AFTER OPERATION.

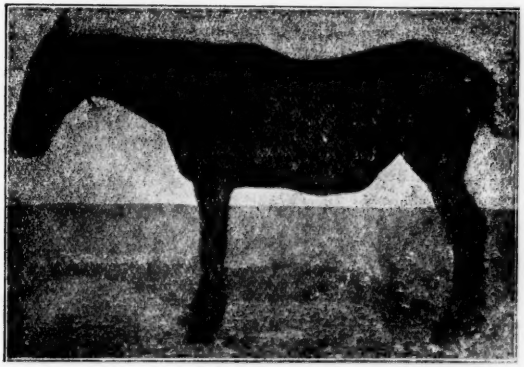


FIG. 4.—PHOTOGRAPH TWENTY DAYS AFTER OPERATION, COMPLETELY RECOVERED.

anus, but every attempt was futile. Hobday now sought the aid of a new incision, this time in the flank, which also failed, and the mare died under chloroform. The stone found on post-mortem weighed 2 lb. 14 oz. The next case was an old horse, also operated upon in the flank. The calculus was situated in the small colon, and by

careful manipulation of the intestinal walls, was worked into the large colon, where, as it was not very bulky, it caused no obstruction. This horse died on the fifteenth day of diffuse pulmonary gangrene. The sixth case published by Hobday and Lowe was a mare about nineteen years old, with a calculus in the pelvic curvature of the colon. The attempt to displace the calculus through a breach made in the wall of the vagina failed. The animal was destroyed after another trial of simple laparotomy, which only resulted in lightly displacing the calculus, which was found on post-mortem to weigh 6 lb. 6 ozs.

As the last of the series, let us record that of Lewis (1906), who practised laparo-enterotomy on a horse affected with intestinal cal-

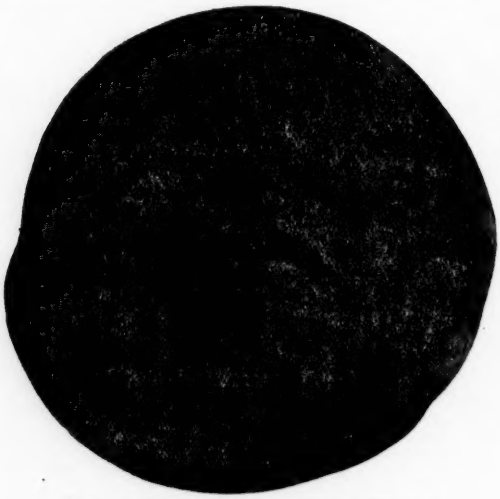


FIG 5.—THE CALCULUS, AFTER REMOVAL.

culus. The opening was made on the right flank, the operation lasting 95 minutes. Here also the patient died after four-and-a-half days. At the post-mortem seven large calculi and sixty small ones were found in the colon.

These being recorded, we think it best, before making observations thereon, to describe the case studied and operated on at our own surgical clinic. A bay mare of native breed, fifteen years old, the property of Signor Antonio Viquery, of Brusson (Aosta), admitted to the clinic the 5th January, 1912. It is a singular fact that this animal was brought because she was lame on the off hind. As the exact position of the cause of lameness was difficult to locate, and was

accompanied by characteristic functional disturbance, we decided to make a very searching examination. When examining the mare, we did not fail to notice the existence of a deformity of the inferior wall of the abdomen in the retro-sternal zone, just in the region corresponding to that of the xiphoid cartilage—this induced us to make an examination by direct palpation. The musculo-cutaneous surface was unaffected, though pendulous at the point indicated, in which we buried our hand, exercising pressure from below upwards. We were greatly surprised to discover in the abdominal cavity the presence of a very heavy body, voluminous, slightly movable, apparently on the xiphoid cartilage, and immediately behind it. The plate (Fig. 1) will show the extent to which this object was noticeable. We made more rectal explorations, combined with palpation, but the results per rectum were always negative, it being impossible to reach the antero-inferior tract of the abdominal cavity. At that time, the clinic was not provided with a radiographic cabinet, but, in truth, as we excluded the hypothesis of tumour, it quickly flashed into our mind that we were confronted with a case of intestinal calculus, either in the diaphragmatic region of the colon or the anterior part of the cæcum. The owner was duly informed, and was requested to furnish us with any information he could give as to the habits and general health of the mare. The question of the lameness now became of minor importance, though we correctly described it as a case of muscular rheumatism affecting the quadriceps cruralis of the right side. The owner told us he remembered the mare had often been affected by abdominal pain after she had eaten her food at the end of a hard day's work, for which she had received veterinary treatment that had so far succeeded in alleviating the trouble. He was finally induced to sell her to the Veterinary School, and she was entered as a patient. Convinced that we had to deal with an enormous calculus in the cæcum, or in the diaphragmatic region of the colon, we decided to perform laparo-enterotomy when the students had just returned from vacation, and thus make use of interesting clinical material for our pupils. To proceed, we thought it best to secure the patient in a dorsal position on the operating table, as we wished to make the opening on the floor of the abdomen, close to the median line, that is, in the zone in which we had first noticed the enlargement. Our suspicions that the bowel had become adherent to the floor of the abdomen proved to be well founded. That being so, a laparotomy at the flank, or at a half-lateral surface of the abdominal walls, would have presented greater difficulties and have kept us far too long from the point where we were most interested. After every possible precaution, the operation was performed on the 10th January, 1912.

We made a wound on the lower abdominal wall immediately to the left of the *linea alba*, and extending to the free margin of the xiphoid region as far as behind the umbilical cicatrix, about 30 c.m. in length. We kept to the left because we thought we could cope more satisfactorily with a prolapsus of the small intestine than with one of the colon. The work was rendered difficult by the thickening of the peritoneal wall, and the existence of many adhesions between the peritoneum and the intestines, and by fibrous formations. After breaking down these, together with much new formation of fibrous and connective tissue, we were able to place both hands in the large xipho-umbilical incision. On exploring the abdominal cavity, we were easily made aware of calculi in the large intestine. At this point, however, we could not be precise as to the exact situation of the stone, which impressed us as being larger than a man's head, very hard, somewhat rounded in shape, and so heavy that in our awkward position we could not lift it with both hands. After a slight pause we again made the attempt with all our might to bring the bowel containing the calculus into the wound, aided by an assistant whose hand was also in the abdominal cavity, but it was all of no avail. The patient now seemed in danger of sinking, and the viscera having been exposed quite long enough, we decided to suspend the operation, and closed the wound for the time being with a triple suture. The patient did well save for an occasional slight attack of colic, and the wound healed by primary union. We made a second trial on the 22nd March, 1912, about two months after the first attempt. This time we fixed the mare on her right side, the fore limbs stretched well in front, and the hinder parts pulled backwards. We made a laparotomy incision as before, but a little above that of the first operation, and about 50 c.m. in length. The adhesions on the abdominal wall were gradually overcome, the seat of the calculus being only a little lower, and the latter was slightly movable. We were now convinced that the calculus was situated in the anterior portion of the cæcum, which had been carried forward of its true position by the weight. The lengthy incision was necessary to allow the hand of an assistant to help in working the obstruction through the abdominal breach. Many efforts were made, always very gentle, and careful watch kept to prevent prolapsus of the viscera. Finally the obstacle was brought outside through the mesentery. Every aseptic and antiseptic precaution was taken by means of bandages, gauze, compresses, etc., and the wound sutured as before. All of us were amazed at the enormous size of the calculus, which weighed 7 kilos., 845 grammes. The patient had hardly any surgical fever, afterwards being fed for the first four days only on milk. After ten days we cut away nearly all

the suture ends, and the wound healed perfectly by the twenty-second day. We kept the mare under observation for three months, during which time she had no constitutional disturbance.

The calculus was of globular form, with a smooth surface of a dark grey colour, with a marbled appearance. The dimensions were:

Maximum circumference	66.5 c.m.
Minimum circumference	64 „
Large diameter	22 „
Small diameter..	18.5 „
Specific gravity	1.6265

On sawing through the calculus, we found in the middle a small stone the size of a pea. Around this foreign body we counted 260 strata symmetrically arranged; there were others, but these were too fine to note. By the way, we remember that Bartherotte (1890) counted 84 strata round a central point.

The calculus when dry, and after losing its cortical stratum, was reduced in weight to 7 kilos. 645 grammes. We need not wonder at this, as Roger (among others), in "Récueil de Méd. Vet.," 1880, when weighing a calculus which had dried, records a loss of 240 grammes.

From Professor Dr. Ivanhoe Ceruti, experimental chemist at Turin, we obtained an analytical report as follows:

Moisture..	13.520 per cent.
Ammonia magnesium phosphate ..	65.442 „
Phosphate of lime	0.942 „
Carbonate of magnesia	2.122 „
Aluminium and iron	0.420 „
Sulphuric anhydride	0.420 „
Silica	0.320 „
Organic substance soluble in ether ..	0.142 „
Organic substance soluble in alcohol..	0.332 „
Organic substances insoluble	16.010 „
	99.700 „

No trace of urates nor of bone salts.

A BRIEF NOTE ON THE ADVANCE BASE VETERINARY HOSPITAL, BAGHDAD.*

By E. BRAYLEY REYNOLDS
(late Major, R.A.V.C. and Officer Commanding.)

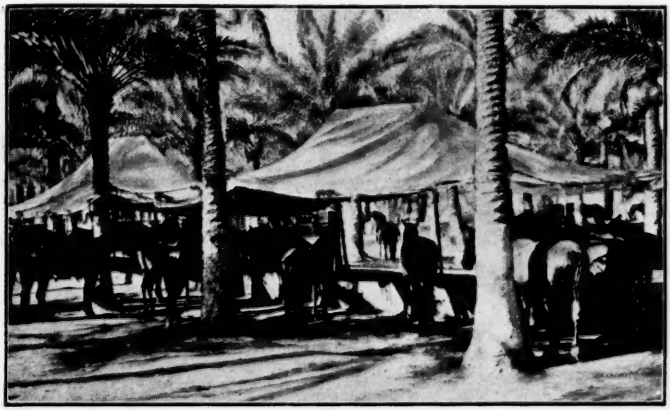
To those who have experience of the Veterinary Hospitals in France, the marked sunshine in the accompanying photographs may excite a feeling akin to envy when they recall the conditions of rain and mud that had at times to be endured in "La Belle France." Rain and mud, however, were by no means absent from Mesopotamia.

The hospital was situated among the mud-walled gardens on the right bank of the Tigris, about three miles below Baghdad. The already existing walls, although utilised as far as possible, had to be supplemented by many others. These walls and the mangers were built of *matti*, which consists of the ordinary earth mixed with a small quantity of *bhoosa* (short straw), moistened with water, and the mixture trampled into a thick pasty mass. This material is built up in layers of about one foot thick, which are allowed partially to dry before another layer is added. If this precaution is not observed collapse of whatever structure is being built is likely to take place. The majority of Indian followers are experts in *matti*. With mud and sunshine they can work wonders, and appear to derive a considerable amount of satisfaction from this class of work.

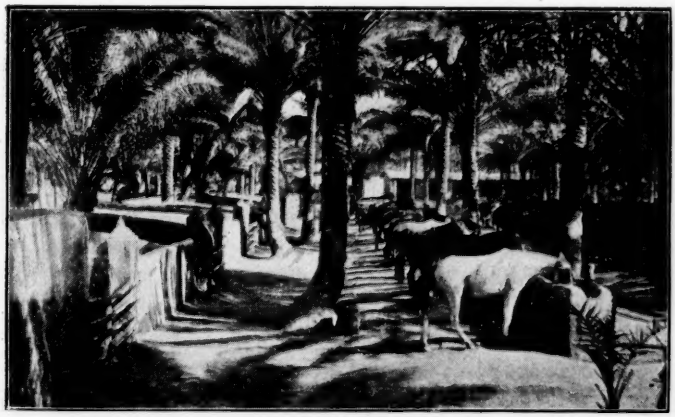
The bases of the date palm trees were also coated with *matti*, the object being to lessen the chance of injury to animals coming in contact with them, the surfaces of the trunks being very rough owing to the bases of the leaves, which are cut off, becoming dried and cracked.

The hospital contained four main wards and three minor wards, more or less detached, the Reception, Biliary Fever and Isolation Wards. The Mange Ward was situated about a mile distant from the hospital. Each of the main wards had a number of open horse lines and paddocks. The horse lines were open to begin with, although they were so placed that the palm trees afforded some protection from the sun. Later on shelters were erected, the roofs of which were made of *chatai*, a sort of reed matting, stretched over a framework of thin poles and covered with several inches of *matti*. This class of roof is very efficient as a protection against the sun, but it is too flat and too porous to afford much protection against rain in the winter. Each paddock had an area of somewhere about 2,000 square yards and contained tent shelters. One paddock is perhaps worth

Editorial Note.—The above description was accompanied by a large number of photographs, all of which, unfortunately, owing to the cost of reproduction, we are unable to reproduce. The notes here given were originally sent to describe these, and are not intended as an attempt at a complete detailed description of the hospital.



Tent Shelter in Paddock in Lame Lines. The Tents secured to the Date Palm Trees.



Boxes and Lines in Surgical Ward. Operating and Dressing Sheds in background.

mentioning in more detail. During the summer time a large number of animals became affected with capped elbows, caused without doubt by lying on the very hard ground and not by the heels of the fore shoes. It was a noticeable fact that almost without exception the animals so affected were suffering from some diseased condition of the fore feet, usually ringbone, or the so-called pedal ostitis. An animal suffering from any diseased condition of the feet will lie down more than a sound one. Those cases in which suppuration was occurring, a comparatively small proportion had to be treated surgically, but for all the cases some means had to be devised whereby bruising of the affected parts would be prevented or rendered less likely. Enough material for bedding was not always available, nor was it efficient. The surface of the ground of one of the smaller paddocks was broken up to a depth of four or five inches and many tons of sand from the river bed were mixed with the broken earth. The addition of the sand prevented the earth from being trodden down firm. The affected animals were turned loose in this paddock, the surgical cases after healing was well advanced, and the beneficial effects were very marked. It was not always possible to form a correct opinion of the degree of lameness or the extent of disease in the feet while the inflammatory condition in the region of the elbow was acute. When this had subsided, however, it was often found that the animal was not likely to be of further service and it was cast.

The watering arrangements were exceedingly handy. The water was pumped up from the river by an oil engine and conveyed in small channels through the various lines and every paddock. A great amount of labour and time was thus saved; only those animals tied on to lines had to be watered, and owing to the water channels traversing each ward the watering space was practically unlimited. The water channels were continued out to the back of the hospital, where the water was used for irrigating several acres of land on which were grown green crops for feeding of the animals in hospital—lucerne, maize and jowari.

All manure was swept up and carted, or carried on pack mules (blind or being worked into condition), to some open ground at the back of the hospital, where it was burnt. Some was burnt in specially built incinerators, and some spread out on the ground to dry, and later raked into rows and burnt. A certain amount was treated by the biological method.

A drainage system had to be provided in the winter time to deal with the large amount of surface water resulting from the heavy rains, otherwise the whole ground surface would have become a

quagmire, and some parts of the hospital would have been flooded. Mesopotamian mud is second to none in adhesive properties. Surface drains were dug leading into a number of large pits, in which the water collected and gradually soaked away. The condition of the roads did not become very bad provided the roads had been well made with a slight camber and kept well watered during the summer in order to prevent the formation of dust holes, and the surface water drained away quickly. A greater factor, perhaps, in preserving the roads during the bad weather was not to allow any but absolutely necessary traffic on them during the fall of rain.

A very slight fall of rain renders the ground surface greasy and slippery, so much so that riding on horseback becomes dangerous and almost impossible. Roughing with frost-nails, the ordinary horse nail sharpened into a kind of frost nail, makes riding safer for the man and more comfortable for the horse. The ordinary square-headed chilled-steel frost nail would be particularly effective.

HÆMOPHILIA IN A YEARLING HEIFER.

By Messrs. J. L. BARLING AND WOOFF, M.R.C.V.S.
(*Hereford.*)

A few evenings ago we were hurriedly summoned to attend a very valuable pure-bred Hereford heifer, one, in fact, intended for the Royal Show, stated to be bleeding from a "cut in the brisket."

Upon arrival we found the animal with a temperature of 105°, membranes blanched, extremities cold and respiration laboured.

In the box were several pools of blood, and the only point of hæmorrhage was a small papillary tumour on the under side of the brisket. From this blood was flowing continuously; not with a rush, but in a steady stream.

With little difficulty the bleeding was stopped and the place sutured.

In spite of continued stimulants, the heifer gradually sank and was finally slaughtered about three hours later.

Cases of hæmophilia in animals have not been commonly recorded, but there is no doubt that they exist, and a similar case occurred in this district some ten years ago, the patient in that instance being a Hereford bull, with a bleeding papillary tumour in the region of the brisket. In this case the wound was only a very slight one in appearance and the hæmorrhage just a continual dribble, but all efforts failed to check it before our arrival, and the patient, apparently healthy in every other way, never seemed to rally from the loss of blood and shock.

A PECULIAR CASE OF INFLUENZA

By G. MAYALL, M.R.C.V.S.,
Bolton.

BROWN mare "Spot," about 10 years old. My attention was called to her because she gave over feeding entirely. On approaching her I noticed pronounced winking of both eyelids which was kept up spasmodically for about a minute and repeated each time one approached her head to take hold of the headstall. Pulse 65; temperature 105°; bowels constipated. Head pendent and dejected look. Prescribed ounce doses of mag. sulph. in the drinking water. The eyelids as they came together made a quite audible noise, and this marked symptom made me suspect some cerebral trouble. Mare much the same next day, but eating a little and bowels acting better. On the third day copious muco-purulent discharge from both nostrils. Medicated inhalations ordered. Appetite had returned somewhat and mare ate a little sloppy bran. Winking of the eyelids still quite marked. The mare showed the ordinary course of catarrhal influenza for 20 days, and the head was held so pendent that she had to be given food and drink in buckets placed on the floor of the loose box, not being able at any time to lift her head up to the manger. On the 20th day (March 8th) there was enormous swelling of the head and nostrils, difficulty in swallowing and breathing and eyelids tumefied. The case looked almost like one of malignant œdema of the head, and there was, in addition to the general tumefaction of the head, a pronounced cocoanut sized protuberance on the bridge of the nose. The discharge still continued from the nostrils. This was sponged away with antiseptic the mare's wind-pipe region was clipped, and for a week four drachms of Lugol's solution was injected into the trachea night and morning. Under this treatment the swelling of the head gradually declined, the breathing improved, and the mare's power to take an increased food supply returned. During the whole of the injection period, and for a week after, a drachm of pot. chlor. was given two or three times daily as an electuary.

On March 25th the mare got down in the box and we had to sling her. The cocoanut sized swelling on the nose persisted for some time after the head itself returned to normal and after all discharge from the nostrils had ceased. It was opened in three places, and a lot of bloody pus evacuated, and was syringed out with warm peroxide of hydrogen solution.

At the time of writing the mare is picking up and eating a fair quantity of long hay, crushed oats and bran.

Remarks.—The constant pendent condition of the head (the lips at times resting on the floor) seems to have been the chief contributory cause of the œdema. The relief given to the mare by the intra-

tracheal injections was very noticeable. The pendent position of the head seemed to favour a quick action of the Lugol's solution, which would be absorbed by the mucous membrane of the trachea, pharynx, larynx, and schneiderean membrane. The mare did not cough at all after the injections, and spots of the solution came down the nostrils at each injection. The flapping of the eyelids still continues, but is perhaps about only half as much accentuated as it was when the illness was commencing and at its height.

Translations and Abstracts.

THE ADMINISTRATION OF OIL OF CHENOPODIUM IN SOFT, OR SOLUBLE ELASTIC, GELATINE CAPSULES, AS COMPARED WITH OTHER MODES OF ADMINISTRATION.*

By MAURICE C. HALL, Ph.D., D.V.M., and MEYER WIGDOR, M.A.,
Research Laboratory, Parke, Davis and Company, Detroit, Mich.

Two of the very evident advantages afforded by the use of soft gelatine capsules are these : They furnish a convenient measured dose, and they supply a capsule with the advantages of the hard capsules (tastelessness), plus the advantage of saving bulk and bother, by combining the drug and the capsule, and the assurance that the capsule will not open in the mouth, pharynx or esophagus. They have proved entirely satisfactory in the administration of oil of chenopodium to experiment animals in our work here, and have been recommended by one of us (Hall, 1917) for use in treating dogs.

The soft capsule, however, has recently been criticised as a container for oil of chenopodium, in a paper by Darling, Barber and Hacker (1918). They state that 3 10-minim doses of oil of chenopodium in soft capsules at hour intervals only removed 66.4 per cent. of the hookworms from patients, as compared with the removal of 97.9 per cent. of the worms by the same oil when removed from the capsule and then administered in freshly-filled hard capsules. By way of explanation they state : " The soft capsules dissolved too slowly to permit their contents to affect the hookworms distributed in the duodenum and the upper part of the jejunum." Undoubtedly, this explanation is intended only as a plausible surmise. If the soft capsule digests or opens in the middle of the jejunum, it undoubtedly misses worms in the upper jejunum and duodenum, but there is some question as to whether it leaves the stomach unopened.

There are several ways of judging whether the soft capsule actually opens in the jejunum or in the stomach. One way is to determine the anthelmintic efficacy of chenopodium exhibited in the soft capsule and compare it with the efficacy of chenopodium exhibited in the

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hard capsules. Another way is to administer the soft capsules to dogs and kill the dogs after various intervals. We have here data of both sorts and these data do not sustain the attitude taken by the writers quoted.

In the first place, our experimental findings are exact and definite, covering treatment, exact number of worms passed for the four or more days after the administration of the anthelmintic and up to the day of death of the animal, and the exact number of worms found post-mortem. There can be no question that the information obtained in this way is more exact than that obtained clinically and by examining the feces for parasite eggs, which method must be depended on by physicians working with human patients.

In the second place, hundreds of experiments show that the ascarid of the dog has a quite definite and dependable reaction to chenopodium, as Hall (1918) has noted, whereas hookworms in man or dogs have no such dependable reaction to any drugs, part of them yielding to one treatment and part quite commonly yielding only after two to five or more treatments. In judging, therefore, the fate of soft capsules of chenopodium, their results in the shape of ascarids removed from the dogs is a surer guide than that in the shape of hookworms removed from man and subsequent fecal examinations for eggs.

Finally, we have made a number of tests in the way of killing dogs at an interval after administering chenopodium in soft capsules and in other ways, and these tests show that the soft capsule does not wait until it reaches some point in the intestine before opening, but opens in the stomach. In this respect, our findings agree with the fact that our critical tests show that soft capsules of chenopodium display as high anthelmintic efficacy against ascarids as do doses of the drug in hard capsules or in castor oil. We have data on 220 dogs that have been given oil of chenopodium or its derivatives, alone or in combination with other anthelmintics, in castor oil, hard or soft capsules, or undiluted and without capsule, with records of all worms passed and worms present post mortem, and these experiments all testify to the ascaricidal efficacy of chenopodium and bear out the statement that it is as effective when given in the soft capsule as when given in the hard capsule or any other way.

In this series of 220 dogs, there are only eight that were given chenopodium in soft capsule, followed immediately with castor oil and not complicated by other considerations (enteric coats, other drugs, repeated doses involving more than one day, etc.) and these eight dogs may be compared with the animals treated by Hall and Foster (1918). These writers gave chenopodium at the rate of 0.3 m.p.k. (mil per kilo) in castor oil to eight dogs and removed 160 ascarids out of 162, an efficacy of about 99 per cent.; they gave

chenopodium in hard capsules at the rate of 0.2 m.p.k. with oilice oil and castor oil on three successive days to eight dogs and removed 15 out of 17 ascarids, an efficacy of 88 per cent. In our eight experiment dogs, all of which were infested with ascarids, four dogs received the therapeutic dose of 0.1 m.p.k., one received a lethal dose of 1.0 m.p.k. with castor oil for protection, and three received doses between 0.1 and 0.2 m.p.k., all in soft capsules. These dogs passed 87 out of 87 ascarids, an efficacy of 100 per cent. In spite of the larger doses used by Hall and Foster, the efficacy secured by larger doses with their mode of administration is slightly inferior to that secured with smaller doses in soft capsules. They report that the dogs in the first series noted above had about one-fourth of their hookworms removed, and in the second series the treatment was ineffective for hookworm. In our series of dogs, seven had hookworm; the treatment with soft capsules removed 23 out of 31, an efficacy of 74 per cent. In a series of four dogs treated by us with single doses of chenopodium, not in soft capsules, at the rate of 0.1 m.p.k. the treatment removed ten of ten ascarids, and none of 16 hookworms from two dogs; at a higher rate it removed five of five ascarids from two dogs.

So far as anthelmintic efficacy is concerned, accurate critical tests on both ascarids, a dependable form for test, and hookworms, a less dependable form, show that if there is any choice between the administration of oil of chenopodium in soft capsules or hard capsules or in castor oil or olive oil, the choice would lie with the soft capsules.

As regards the time and place of opening of the soft capsule in the digestive tract, a series of experiments was performed to furnish information on this point. The first set of tests were with the soft capsules; the second set were with chenopodium administered in oil.

The first set of tests using the soft capsules may be summarized as follows:

Without purgative.

Dog No.	Capsules.	Dog killed.	Result, capsules.	Digestive tract.	Remarks.
251	3 5-minim	26 min.	In stomach; unopened.	Normal.	Food in stomach.
252	2 5-minim	42 min.	In stomach; unopened.	Normal.	Food in stomach.
253	3 5-minim	1 hr., 2 m.	In stomach; 1 opened, 1 cracked, 1 softened.	Normal.	Food in stomach.
254	3 5-minim	1 hr.,21 m.	In stomach; unopened.	Normal.	
354	3 5-minim	1 hr.,30 m.	Digested; chen. odour in stomach and small int.	Petechiæ in stomach and small int.	
348	3 5-minim	2 hrs.	Digested; chen. odour in stomach.	Normal.	Food in stomach.
331	3 5-minim	2 hrs.,46 m.	Digested.	Gas. int. hem.	

With purgative.
(These dogs all received 3 5-minim capsules and the purgative shown.)

Dog. No.	Purgative.	Dog killed.	Result, capsules.	Digestive tract.	Remarks.
328	Ol. ric. 30 mils.	30 min.	Digested ; chen. odour and ol. ric. near ileo-cecal valve.	Mild hyperemia.	
355	Cascarin 2 grs.	30 mins.	In stomach ; open and half digested.	Gast. int. petechiæ.	
329	Ol. ric. 30 mils.	1 hr.	Digested ; chen. and ol. ric. in stomach.	Normal.	
349	Calomel 2	1 hr.	Digested ; chen. odour in stomach.	Inflam. and hem.	Dog vomited fragments of capsule.
330	Ol. ric 30 min.	2 hrs., 4 min.	Digested ; oil in large int.	Normal.	1 asc. pres. in large int.

It will be noted from an examination of the above tables, that when the soft capsules were given *without purgatives*, they were recovered from the stomach unopened as late as 1 hour and 21 minutes after administration ; they were found opened in the stomach as early as 1 hour and 2 minutes after administration ; and they were entirely digested at intervals of 1 hour and 30 minutes to 2 hours and 46 minutes. It appears, then, that soft capsules given without purgation will open in the stomach, and probably open from one to two hours after administration. This coincides with the time of onset of symptoms of salivation and vomiting in animals given chenopodium in soft capsules, where these symptoms appear. Chenopodium could be found in the small intestine as early as 1 hour and 30 minutes after administration.

Where the soft capsules were given *with purgatives*, the time of opening in the stomach was materially shortened. As early as a half-hour after administration, and after all longer periods, the capsules were partly or entirely digested, and chenopodium was detected near the ileocecal valve in 30 minutes in one instance.

It will be noted that in no cases were capsules found unopened in the intestine. When they were found at all, they were in the stomach : here they were found unopened, open, and partly digested : here the oil of chenopodium could be detected in almost all cases, as late as an hour after administration in the case of capsules given with purgatives, and as late as two hours after administration in the case of capsules given without purgatives.

Not only does all the evidence point to the opening of the capsule in the stomach, but other considerations sustain this idea. The soft

gelatine capsule becomes very much softened by exposure to the moisture of the digestive fluids of the stomach, not to mention the digesting action of these fluids. Such softened capsules break very easily on pressure, and it seems likely that the pressure applied at the pylorus would break these capsules if they started to pass unopened. Possibly the early opening of capsules given with purgatives is due to increased gastric peristalsis and prompt rupture of the softened capsule, with digestion of the capsule hastened as a result. It is also possible that the purgative stimulates secretion of the digestive fluids.

Following up the foregoing experiments, some tests were made to ascertain the fate of oil of chenopodium given without capsule of any sort, with and without purgatives. To aid in following the course of the chenopodium, it was mixed with Eaton's fat-soluble blue. The doses were at the rate of 0.1 m.p.k.

Without purgative.

Dog No.	Dog killed.	Oil found.	Digestive tract.	Remarks.
318	47 min.	In stomach.	Normal.	
321	1 hr., 4 m.	In stomach and small intestine.	Petechiæ in pyloric stomach ; pylorus and duodenum hyperemic.	
319	1 hr., 45 m.	In stomach.	Normal.	

With purgation.

320	32 min.	In stomach.	Normal.	30 mils ol. ric.
322	1 hr., 4 m.	In stomach.	Normal.	30 mils ol. ric.
351	1 hr., 30 m.	In stomach.	Gast. hem., small int. hyperemic.	2 grs. cascarin, 1 asc. in int., apparently dead.
357	2 hrs.	In stomach.	Normal.	2 grs. cascarin.
352	2 hrs., 7 m.	In stomach.	Few hem. in int.	2 grs. calomel, 2 asc. in int., apparently dead. Fed before dosing. Vomited in hour after dosing.

323. This dog was given the chenopodium with oil-soluble blue and 30 mils of castor oil, and 29½ hours later the dose was repeated, this time with oil-soluble orange instead of blue. The dog was killed 2 hours and 12 minutes later. The orange-coloured chenopodium was found in the ileum ; there was no trace of the blue-coloured chenopodium given the previous day. The ileum was mildly hyperemic.

In view of the fact that small amounts of oil, such as would slowly pass the pylorus, cannot readily be detected even when the fat-soluble colouring matter is used, one cannot affirm much as to where chenopodium was not present ; one can only make affirmation as to where it was present. From the experiments tabulated above, we find that chenopodium given without purgatives or the use of capsules may

still be present in the stomach 1 hour and 45 minutes after administration; when given with purgatives, without the use of capsules, it may still be present in the stomach 2 hours and 7 minutes later. We also find that even without purgatives, the oil may be in the small intestine in 1 hour and 4 minutes, and with purgation it may be in the ileum 2 hours and 12 minutes after administration, and the evidence of an apparently dead ascarid indicates that it may be there in an hour and a half. Doubtless it is in the small intestine earlier, as the experiments with capsules show.

The fact that the chenopodium in soft capsules, given with castor oil, may rapidly get to the small intestine, is perhaps due to the fact that the castor oil can exert its action at the start, unimpaired by the constipating chenopodium in initiating peristalsis.

The slowness with which the oil leaves the stomach confirms the position taken by Hall (1918) to the effect that anthelmintics, at least some anthelmintics, probably do not need to be allowed "time to act" on the worms before purgatives are administered. In this connection, Hall states:

"It is so generally believed and stated that anthelmintics should be allowed time to take effect before any purgation is attempted, that it seems almost unsafe to dispute the proposition. Dock and Bass even explain the failure of remedies to act effectively as possibly due to 'the rapid carrying down of the thymol by peristalsis to below the location of the worms,' even in the absence of purgation. My own experiences have led me to fear more the absorption of the drug in the stomach before reaching the site of the worms. In over two years' experiment work, involving the treatment and post mortem examination of over 250 dogs, the results seem to be a little better, if anything, where the anthelmintic and the purgative are administered simultaneously than where the anthelmintic is allowed to precede the purgative by an hour or longer. Such combinations as oil of chenopodium and castor oil, chloroform and castor oil, santonin and calomel, etc., seem to be as effective as the ingredients of the combinations administered separately and at intervals. It is well known, of course, that such anthelmintics as areca nut are themselves purgative. Even if it were true that anthelmintics are more effective if purgation is postponed, and it can be shown that the patient is safer where the purgation is given with the anthelmintic, would it not be good practice to repeat a safe treatment oftener, rather than to give a less safe treatment fewer times?"

We are unable to reconcile the differences in the results obtained by Darling, Barber, and Hacker and those obtained by us, as regards the value of the soft gelatine capsule of chenopodium, but we have

no adverse comment to make on their results. We merely state our own results and indicate that there is a disagreement. There might have been some differences in the capsules used by them and the capsules used by us, and it might be that the capsules harden with age, though we have no evidence of our own on this point. The soft capsule can be hardened with formalin to the point where it will not digest, and there are other substances which will have the same effect.

Our findings further disagree with theirs on a number of other points which can only be mentioned here. For one thing, they found oil of chenopodium given in liquid petrolatum 88.7 per cent. effective, while soft capsules were only 66·4 per cent. effective, whereas we find that the use of liquid petrolatum cuts the anthelmintic efficacy, even against ascarids, to zero at times, while the soft capsules have an ascaricidal efficacy very close to 100 per cent. Experiments covering this point have been published by Hall (1918) in a study by Hall and Hamilton (1918). Darling, Barber and Hacker state that " Chenopodium is relatively just as efficacious in removing *Ascaris*, *Clonorchis* and *Tænia* " as in removing hookworms. So far as the dog is concerned, hundreds of critical experiments show that chenopodium is unequalled for use against ascarids, and is a very inferior and undependable anthelmintic for use against *Tænia* and *Dipylidium*, removing them but rarely and showing no such efficacy as is shown by male fern or kamala. They prefer magnesium sulphate to castor oil as a purgative with chenopodium. This is a moot point which we will discuss in another paper.

CONCLUSIONS.

On the basis of many experiments with dogs, we feel safe in saying that the following is true of dogs and that these findings apply in part to man :

1. The soft, or soluble elastic capsules of chenopodium open in the stomach and not in the small intestine.

2. The foregoing statement is sustained by the high ascaricidal efficacy of the soft capsules of chenopodium, as well as by their efficacy against hookworms.

3. The administration of purgatives at the same time as the soft capsules, hastens the opening of the capsules. Without the purgatives, capsules lie in the stomach as long as 1 hour and 21 minutes, and apparently digest in one to two hours. With the purgatives, capsules are wholly or partly digested in thirty minutes. Without purgatives, chenopodium from the capsules may be detected in the intestines in 1 hour and 30 minutes. With purgatives, chenopodium may be detected in the intestines in thirty minutes.

4. The more rapid opening of capsules given with a purgative

is probably due to the mechanical action of heightened peristalsis on the softened moist capsule and to increased secretion of digestive fluids as a result of stimulation by the purgative.

5. Given in soft capsules, chenopodium may stay in the stomach as long as 1 hour and 45 minutes if given without purgatives, or 2 hours and 7 minutes if given with purgatives; or may be detected in the small intestine in 1 hour and 4 minutes if given without purgatives, and in 1 hour and 30 minutes if given with purgatives. It is probably present in the small intestine earlier.

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COCCIDIOSIS IN CATTLE

By N. P. WAY AND W. A. HAGAN,
New York State Veterinary College at Cornell University.

Symptoms.—The first symptom noted is the appearance of blood in the feces, as a bloody diarrhœa, in the form of dark brown clots, or bright red streaks. In the early stages the blood is always on the outside of the feces, but later on it may be mixed throughout the fecal mass. The animals are dull, show a disinclination to move about, lie down a great deal, eat little or nothing, and emaciate very rapidly. The skin becomes tight, the hair coat rough, and the tail and buttocks are stained with feces. The pulse and temperature may be slightly increased. The abdomen gradually assumes a tucked up appearance, peristalsis is much diminished, the feces are scanty and are passed with a great deal of straining as the disease progresses.

Course.—Hutyra and Marek state that the period of incubation is three or four weeks. After the symptoms develop the disease runs a course of from two to seven days. In the acute form death evidently occurs during the second or third day. In those animals that recover the appetite returns on the fifth or seventh day and at first is depraved. This may be preceded by great thirst.

Diagnosis.—The diagnosis is made from the history and symptoms, but can only be positively established by microscopical examination and finding the coccidia either in the feces, in scrapings from the mucous membrane, or in sections of the intestine. However, the passage of blood in the feces with tenesmus, lack of appetite, cessation of rumination, and rapid emaciation with absence of history of feeding causes, are suggestive.

Treatment and Prophylaxis.—Since coccidia are known to be very resistant to heat, cold, and ordinary disinfectants, and as the life history of the parasites is still obscure, the treatment is largely symptomatic and prophylactic measures only can be instituted against the probable sources of infection. As coccidia gain entrance through the food and water, care must be taken that the water supply is fresh and pure, and that forage is clean and plentiful in the pasture, and well cured if in the barn. The line of treatment employed in these herds was a laxative, an intestinal disinfectant, an astringent enema, and a tonic. The laxative and the disinfectant were combined as follows :—

Liquid petrolatum (Natol, Parke-Davis)	10 ounces
Formalin	1 ounce

Each animal received from six to eight ounces of this mixture, the theory being to keep down the multiplication of intestinal bacteria, which become pathogenic as soon as the epithelium has been destroyed by coccidia, and also to hasten the elimination of coccidia and debris. As an enema, about three quarts of a warm, 1 per cent. alum solution were administered twice a day through a small rubber tube. The tonic used was a 1 per cent. aqueous solution of strychnine sulphate, given in half-ounce doses three times a day. In case No. 3 secondary tympany was noted after three days and it was necessary to trocharise the rumen on two succeeding days. At each time of trocharisation, an ounce of a synthetic chlorine disinfectant, " Fecto," was injected into the rumen through the canula of the trocar. After the second trocharisation the tympany disappeared and the heifer made an uneventful recovery. The only prophylactic measures followed were a change of food and water, and the administration of a dose of formalin in oil to all animals under four years of age on both premises.

The efficacy of treatment has not been sufficiently tried out to warrant conclusions, but of the seven animals treated, only one died, and this one was considered beyond help when first seen. It is believed that if treatment is begun as soon as symptoms appear, it will prove very effective.—*The Cornell Veterinarian.*

BACTERIUM ABORTUS INFECTION OF BULLS.

[PRELIMINARY REPORT.]

By J. M. BUCK, G. T. CREECH, AND H. H. LADSON,
Pathological Division, Bureau of Animal Industry, United States Department of Agriculture.

NUMEROUS investigators have called attention to the fact that *Bacterium abortus* agglutinins and complement-fixing bodies can frequently be demonstrated in the blood serum of bulls from abortion-infected herds. Such animals in consequence have frequently been referred to as being systemically infected. While the presence of these bodies constitutes strong evidence that abortion infection exists, or has been present, success has been reported in associating positive reactions with the causative infection in so few instances as to have resulted in a certain amount of speculation regarding the significance of these reactions in male animals.

Literature, it is true, records no great amount of investigative work in connection with bulls suspected of being infected with abortion disease where the object has been the isolation of the causative micro-organism from the organs or tissues of the animals or the demonstration of lesions associated therewith.

Schroeder and Cotton,* in investigating this problem, describe two cases that came under their observation. They state that one of the bulls at the time of autopsy showed the presence of an abscess involving the epididymis of one testicle from which *Bact. abortus* was isolated. The other animal was permitted to serve a cow that was considered to be free from abortion disease. Seminal fluid which was recovered from the vagina immediately following the service and injected into numerous guinea pigs produced *Bact. abortus* lesions in one of the experimental animals.

Rettger and White† describe endeavours to associate the presence of the infection with positive serum reactions in three cases which they studied. In two of the animals neither abortus infection nor pathological changes could be demonstrated. In the third they call attention to the finding of two abscesses or cysts in the region of the groin, near the point of attachment of the scrotum; but from these abscesses they were unable to isolate the abortion organism, thus failing to obtain bacteriological evidence of the infection.

In view of the positive bacteriological findings of Schroeder and Cotton the present writers were prompted to undertake further

*Schroeder, E. C., and Cotton, W. E., Some Facts About Abortion Disease. In Journ. Agr. Research, v. 9, no. 1, p. 9-16, 1917.

†Rettger, L. F., and White, G. C.: Infectious Abortion in Cattle. Conn. Storrs Agr. Exp. Sta. Bul. 93, p. 199-249, 1918. References, p. 246.

Journal of Agricultural Research, Vol. xvii., No. 5, Washington, D.C. Aug. 15, 1909. Key No. A-49.

investigations, involving a considerable number of animals, in an endeavour to ascertain with what frequency abortus infection could be demonstrated in the generative organs of bulls giving positive or suspicious reactions to the agglutination test for this disease, and to determine whether or not pathological changes are commonly associated with such infection.

EXPERIMENTAL PROCEDURE.

The procedure employed by the writers consisted in securing blood samples from the animals as they arrived at one of the abattoirs in close proximity to Washington, D.C., for slaughter. No information was available regarding the original source of the bulls or the exposure sustained. Each sample was given a number corresponding to the serial number of a tag that was attached to the animal's ear at the time of bleeding. The blood samples were then taken to the laboratory for the application of the agglutination test. At the time of slaughter, which was usually the following day, those animals giving positive or suspicious reactions were autopsied as carefully as abattoir conditions permitted, and the organs of the genital system were secured for further study. Cultural work was depended upon as a means of detecting infection, the medium employed consisting of 3 per cent. glycerin infusion agar to which approximately 5 per cent. sterile blood serum was added. To reduce the oxygen tension the inoculated tubes were subjected to incubator temperature in closed jars in the presence of fresh cultures of *Bacillus subtilis*.

During the period from December 9th, 1916, to July 7th, 1918, the agglutination test for abortion disease was applied to 325 mature bulls. Of this number 288 gave negative results to the test. The manner in which the remaining 37 reacted is of considerable interest, inasmuch as the intensity of the reactions appeared to bear some relation to the cultural results.

The manner of applying the test consisted in the making of a 1 to 10 basic dilution of the blood serum. To the four tubes utilised for each case were added 0.4, 0.2, 0.1 and 0.05 cc. of this basic dilution. The amount of test fluid added to each tube was 1 cc.

The vesiculae seminales, vasa deferentia, testes, and epididymides were secured from the 37 bulls whose blood serum showed the presence of *Bact. abortus* agglutinins. From 15 to 20 tubes of medium were utilised for culturing the various organs from each bull. These investigations resulted in the demonstration of the presence of *Bact. abortus* infection in four animals—No. 88, 98, 136, and 409—and in the detection of marked lesions in bulls 98 and 409.

A brief description of the work performed, and the findings in these cases follow.

CONCLUSIONS.

Bact. abortus infection may involve organs of the generative apparatus of bulls, producing chronic inflammatory changes.

Of the generative organs, the seminal vesicles appear to furnish the most favourable site for the lodgement and propagation of abortion infection.

The presence of *Bact. abortus* infection in bulls appears to be more strongly indicated by relatively marked than by slight reactions to the agglutination test for this disease—Reprint from *Journal of Agricultural Research,* vol. XVII, No. 5.

CERTAIN POINTS IN THE LIFE HISTORY OF *MELOPHAGUS OVINUS LINN*, THE "SHEEP LOUSE FLY" OR "SHEEP TICK."

By G. F. HILL F.E.S.

Proceedings Royal Society Victoria, Vol. xxxi (*New Series*), *Pt.* 1, 1918 (*Abstract*).

THE enforcement of the Sheep Dipping Act in Australia for the control of the louse fly has not had the effect of eradicating it. Sheep owners contend that this is explainable by the fact that the louse flies and their pupæ become dislodged from the host and remain visible in the grass, brushwood or other positions, that the pupæ then hatch into adults, and with the dislodged adults subsequently re-infect sheep.

From experiments the incubation period on the host was shown to be twenty-two to twenty-four days in winter and nineteen to twenty-one in spring.

From leaving the pupa case until becoming mature thirteen days was occupied, but attempts to determine the length of the life of the female were not satisfactory, and accordingly it was not possible to obtain a complete record of the number of pupa produced by one female.

Although it has been generally thought that the kidd lives only a very short time apart from its host, this was shown to be somewhat erroneous. Unfed adults under one day-old lived as long as fourteen days in winter in soil with leaves and in a tree trunk in a cellar. Under the latter conditions three to seven day-old and fed adults lived also fourteen days. Ordinary adults placed in a tree trunk in a cellar in winter all died by the eighteenth day.

The experiments to determine the visibility of the pupæ removed from the host showed that in wool in a tin at a temperature of 60–90°F.

the last day upon which young emerged from the pupa was forty-two days, and 72 per cent. of pupa cases produced young. On sand on a lawn at from 34 to 86°F. hatching took place from the twenty-second to thirty-fourth day, but the percentage of pupa bringing forth young was only 4 per cent. From his experiments and observations the author is of opinion that while a certain amount of re-infection (from dislodged " ticks " and the progeny of dislodged pupæ) is not only possible, but very probable, most of the parasites found on previously dipped sheep are the progeny of pupæ extruded prior to dipping and which have escaped the destructive action of the fluid. He experienced this difficulty in his experiments.

Even under favourable conditions the number of " ticks " which survive four or five days off the host and subsequently re-infect " tick," free sheep must be extremely small, much too small to account for a general reinfection of a clean flock or even a moderately large number of its members.

THE LIFE HISTORIES OF *HABRONEMA MUSCÆ* (CARTER), *HABRONEMA MICROSTOMA* (SCHNEIDER) AND *HABRONEMA MEGASTOMA* (RUDOLPHI).

By G. F. HILL, F.E.S.,
Proceedings Royal Society Victoria, Vol. xxxi (*New Series*), *Pt.* 1, 1918.
(*Abstract*).

AFTER discussing the work of Ransom in America, in discovering that *Habronema Muscæ* (Carter) of the house fly *Musca domestica* was an intermediate stage in the life history of a nematode which is found in the stomach of the horse, the author confirms these facts for Australia and works out the life cycle of the second two species.

It now appears that in the the case *H. megastoma* the eggs gain the cavity of the horse's stomach from the tumours produced by this species and in the voided fæces the embryos are also taken up by larvæ of *Musca domestica*. Passing through the pupa they appear in the adult fly, where they are found in the abdominal cavity. If infected flies are taken into the horse's stomach, either in food or water, the life cycle is completed. Dead or semi-dead flies are common in mangers and water troughs. Experimental evidence of the immature forms of the worm actively leaving the fly so as to infect the horse's lips or skin was not obtained.

In the case of *H. Microstoma* the life cycle was found to be identical to the above save that the intermediate host was *Stomoxys calcitrans*. Although this is a blood-sucking species, no evidence was forthcoming to show that the immature worms ever entered the horse's blood stream by way of the flies' mouth parts.

In hot countries *H. Megastoma* and *H. Microstoma* are important nematodes of the horse's stomach, where the former causes tumours and abscesses and in some cases abscesses in the spleen also. By some workers, Habronemic granulomata and Habronemic conjunctivitis, two important Australian diseases, are thought to be caused by the larvæ of *Habronema*. Although this surmise requires confirmation the finding of *H. muscæ* in Australia and experimental proof of the life histories of *H. megastoma* and *H. microstoma* is a distinct advance in veterinary helminthology. Older students will remember the last two species better as *Spiroptera megastoma* and *Spiroptera microstoma*.

ACUTE GLANDERS IN MAN.

By T. HUNTER, M.A., B.Sc., M.D. Glasg.
(*Lieutenant-Colonel, I.M.S. : Civil Surgeon, Naini Tal.*)

As acute glanders in man is an unusual condition and one likely to give trouble in diagnosis, at least in its earlier stages, it has been thought worth while to put this case on record. The symptoms corresponded fairly closely to those described by Goodall in his text-book on fevers. This book, however, was not available for reference till after the termination of the case, and the only descriptions of glanders in man that could be found whilst the patient was alive were records of a much less acute infection, also in an officer of the Indian Civil Veterinary Department, described by himself.* That infection lasted two years and four months, and then, after an interval of eight months, lighted up again and lasted for a second period of two years. My case was totally different from this and its history is as follows :—

A veterinary officer, aged 34 years, employed in laboratory work, was admitted to the Ramsay Hospital, Naini Tal, on June 22nd, 1919, complaining of fever, headache, pain in both legs and in the left shoulder, of six days' duration, the illness having definitely begun on the afternoon of June 17th with malaise, fever, and headache. The patient was a robust man. He had been inoculated for the enteric group in 1917. On admission the mouth temperature was 102° F. and the pulse 88 per minute, the tongue was heavily coated, and yet the patient did not look very ill. The pain complained of in the left shoulder seemed to be around rather than in the joint, but nothing abnormal could be found. On both calves there was an appearance like a small boil which had missed coming to a head ; on the front of the left shin there was a red inflamed area like erythema nodosum, and on the dorsum of the left foot there was a painful area. Nothing abnormal was found in the chest or abdomen ; the liver and spleen

* "Journal of Comparative Pathology and Therapeutics," vol. xxvi, p. 223, and vol. xxix, p. 26.

were not enlarged. A blood film showed distinct increase in the polymorph leucocytes. There was no sign of malaria.

The complaint of headache, the dissociation between temperature and pulse, and the appearance of the tongue suggested a tentative diagnosis of one of the typhoid group. The increase in the polymorphs was definitely opposed to this, but it was conceived as possible that there was in addition to the typhoid an infection with staphylococcus causing the boils and accounting for the blood picture. Asked on the point the patient was definite that he had not been working with staphylococcus or other pyogenic organism.

Directly on admission blood was drawn from a vein and inoculated into oxbile; a Widal was also done. The report on these was that the blood in oxbile had remained sterile, but that the Widal gave a positive reaction to B. *typhosus* in a dilution of 1.500 and a feebly positive reaction to *B. paratyphoid A* in 1.50, and *B. paratyphoid B* in 11.100, and strongly suggested a typhoid infection. This confirmed the diagnosis arrived at clinically.

For the next week the temperature ran about 104°, generally below, occasionally above, and no new symptom developed. There was still the marked dissociation between the temperature and the pulse, the latter ranging between 80 and 100. But clinically the patient did not resemble a case of typhoid and doubts began to be felt about the diagnosis. A blood film taken on the 29th still showed marked increase of leucocytes. The boils were subsiding and the inflammation over the shin and foot was very much less. The following day the abdomen was slightly tympanitic, reviving the typhoid diagnosis.

On June 30th one or two small pustules appeared on the trunk and scalp, and the back of the right hand became inflamed. The bacteriologist took smears and made cultures from the pustules and reported them sterile. Blood was also taken and injected into broth, and again nothing could be grown.

Problems of Diagnosis.

It was now beginning to be perceived with certainty that the disease was either not typhoid or was typhoid with some other infection superimposed. In view of the profession of the patient, and as he had been employed in the manufacture of mallein, glanders was considered; but the sterile pustules seemed to negative this, and as the pustules were in some places umbilicated for a couple of days, the suspicion of small-pox superimposed on typhoid had considerable attention. On July 2nd and 3rd very many fresh pustules appeared and large confluent pustular areas were formed, worse on the scalp. In spite of the negative bacteriological reports a definite diagnosis of acute

glanders was made on July 3rd. On the 4th it was manifest that the old inflamed area of the left shin had broken down, and there was a second area above the left knee which looked suspicious. An incision was made into each and from each a small quantity of thick gelatinous pus was evacuated. Some of this pus was examined bacteriologically and was reported to show practically pure cultures of a bacillus morphologically identical with *B. mallei*.

From this date the condition rapidly went from bad to worse. Fresh pustules continued to appear until it was hardly possible to find a piece of skin free for the area of a finger. Many coalesced and formed large pustular areas. The face was affected with the rest of the body, and the resulting swelling of nose and eyelids made the patient unrecognisable by his friends. From the evening of July 4th the patient was unconscious and breathing stertorously, though nothing was found in his chest at this stage. On the 5th abscesses were opened on the back of both hands and on the dorsum of the left foot showing the same thick gelatinous pus in very small amount. On the 6th examination showed coarse râles at the base of both lungs, doubtless hypostatic. Death occurred at 4 p.m. on this date.

Treatment was symptomatic and as for typhoid till July 1st, when intravenous injections of eusol, 100 c.cm. doses, were begun. These were given daily till the end. At first the pustules were opened, cleaned, and treated with tinct. iodine. They became so very numerous that this was discontinued on July 4th. The organism isolated from the pus was injected into a guinea-pig and produced typical orchitis of glanders as found in those animals, with an exudate into the tunica vaginalis from which bacilli like that of glanders were easily recovered.

The bacteriological investigations were conducted by Major A. Hayes, R.A.M.C., of the Naini Tal enteric depôt laboratory.—(*The Lancet*, February 7th, 1920.)

SKIN DISEASE OF THE TAIL, A STAPHYLOCOCCIC FOLLICULITIS OF THE TAIL IN BOVINES.

BERNE THESIS BY BORCIE.

SKIN disease of the tail (tail worm) is a widespread disease; it has been previously described by Rychener under the name of *Caries vertebrarum caudae*. It is mostly benign, but in some cases it ends fatally by septicæmia.

The coccygian vertebræ number 12 to 20 in cattle (16 to 21 according to Cornevin and Lesbre); towards the extremity they become small, thin, cylindrical; the last is most often cartilaginous, with a rounded end. The vertebral column ends three to 10 inches

from the end of the tail; at this point the skin thickens from a sixth to a quarter of an inch; it encloses sebaceous and sweat glands. On a square centimetre one can count 360 to 400 hair follicles and 125 to 130 sweat gland orifices. The hair follicles are implanted obliquely; they are about one-fifth of an inch long and penetrate as far as the conjunctive tissue. The sebaceous glands form a yellow obtuse cone for which the large base situated at the surface measures about two-fifths of a millimetre. The sweat glands abound in the region of the tuft of the tail; the secreting part measures 90 to 120 microns in thickness; it is continued by an excretory canal 30 microns in diameter which opens into a funnel, the enlarged part measuring about 150 microns. The accidents causing the disease occur in animals of both sexes, at all ages and under the most diverse conditions of management. At first there is redness, swelling, heat and localised sensibility, most often at the extremity of the tail up to a length which varies from 16 inches to a few inches; sometimes the extremity is free for a length of three or four inches and the inflammation situated higher up. Generally the area is hard and tense; in other cases it is soft and very flexible. Often there is strong arterial pulsation. The ganglia may be swollen and painful.

The hair is almost always glued together and forms tufts. Very often the skin is studded with nodules and vesicles which contain drops of clear or yellow serum. One or two days later little accumulations of yellow and thick pus occur at these points. Afterwards brown crusts form which enclose a tissue of fleshy granulations. Little by little a fibrous cicatrical tissue is formed, surrounded by a reddish aureole. In some cases the lower part of the tail necroses and is cast off (dry gangrene). Histologically the lesions consist essentially of a purulent infiltration of the hair follicles. The pus contains coagulated blood; it dilates the follicle, which may attain a millimetre in diameter. The suppuration reaches secondarily the sebaceous glands, then the skin (purulent dermatitis) where it provokes the formation of pustules and ulcerations. The conjunctive tissue does not present any trace of reaction in the immediate neighbourhood of the lesions. Bacterial examination in all cases reveals *staphylococcus pyogenus* and chiefly the variety *aureus*. The microbes penetrate into the hair follicle between the hair and sheath as far as the papillæ whose epithelium they desquamate (purulent papillitis). The microbes are derived from the fæces; they are the normal hosts of the digestive tube.

Cure has been obtained in cases by the application of Labouraud's pomade (flowers of sulphur 1 part, chloroform 1 part, lanoline 4 parts).

Literature contains several records of serious skin disease of the

tail followed by septicæmia and ending in death. Now and then grave enzootics have been noted.

The following case gives an idea of this course. A pedigree bull of great value, aged 18 months, showed a phlegmon at the end of the tail, 5½ inches in diameter with several deep purulent foci of infiltration.

The tuft of the tail was covered with a blackish crust. Amputation was performed at about three inches from its end. The wound granulated and suppurated ; a severe œdema arose up towards the root of the tail. The temperature rose to 104°F. ; food was refused, the hind parts swayed ; weakness was marked. The patient fell heavily and fractured the left horn ; at the same time a fracture of the right articular apophyses of the caudal and sacral vertebræ was established. After 11 weeks the bull was slaughtered. At the autopsy :—Vertebral caries at the level of the fractures ; abscess and suppuration in the medullary canal ; metastatic abscess of the lung with staphylococci, streptococci and fine bacilli.

The author considers " tail worm " as analogous to sycosis of the beard in man.

G. M.

Personal.

Amongst the names of successful candidates for the degree of M.B., Ch. B. in the recent Pass list of the University of Liverpool Musical School was the name of Mrs. Mary S. Share Jones, LL.B., B.A. Dr. Share Jones is the wife of Professor Share Jones, the Director of Veterinary Education in the same University.

Captain Robert Daubney, M.R.C.V.S., has recently been sent by the Board of Agriculture and Fisheries to the United States to study parasitology in the Laboratory of the Bureau of Animal Industry, Washington.

NOTICES.

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